U.S. PATENT APPLICATION

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Invention: OBJECT IMAGE PRINT SERVICE SYSTEM

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SPECIFICATION

TITLE OF THE INVENTION

OBJECT IMAGE PRINT SERVICE SYSTEM

BACKGROUND OF THE INVENTION

5   Field of the Invention

The present invention relates to television game machines

by which a user can select an image of a virtual world constructed

in a television game and print out the selected image. More

specifically, the present invention relates to a television game

10   image print service system enabling a user to arbitrarily select

a and print out virtual world images *That are* ~~variable~~ according to user's

play in a game.

Description of the Background Art

15   Conventionally, in television games, the state *of The game* during play

are ~~is~~ only kept in *The* ~~user's~~ mind after game play. To share the fun

~~during~~ *Of* the play with someone *else After The game is over*, the user has to describe it orally.

Thus, ~~suggested is a~~ game machines *have been provided* that can store an image

representing the state during play in memory, and *be restarted* ~~start the game~~

20   ~~again~~ to display the stored image on a screen as *a* ~~required~~.

Such game machines however, requires ~~its~~ *The* game machine *Console* ~~body~~

for reproducing and displaying the image stored in the memory.

Therefore, it is substantially impossible to show the reproduced

image to someone at an arbitrary place *Where No Console exists*. In other words, to

25   reproduce the game image and show it to someone *else*, the user first

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has to bring the memory with the game image stored therein to a

place where a game machine has been installed or *is* available, or

bring both the memory and the game machine ~~body~~ *Consol*. Thus, in

conventional game machines, it is impossible to carry a desired

5   game image at will and show it to someone at an arbitrary place *where*
no console exists

SUMMARY OF THE INVENTION

The present invention ~~is made to~~ *is designed* solve the problem *above*, *described*

~~and an~~ *An* object of the present invention is to provide a television

10   game machine and a television game image print service system

enabling a user to select an image of a virtual world constructed

in a television game and print out the selected image, so that

the user can carry a desired game image at will and show it to

someone at an arbitrary place *without the need for a game machine console*.

15   The present invention has the following features to achieve

the object above.

A first aspect of the present invention is directed to an

apparatus for displaying an object image, comprising:

an object image generator for generating the object image

20   by operating an object image generation program previously

provided, according to instructions from a user;

a selector for selecting *an* arbitrary part of the generated

object image, according to instructions from the user;

a transition information generator for generating

25   transition information when the object image is selected; and

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a transition information storage device for storing the transition information, wherein

the object image arbitrarily selected by the user is recoverable at a future time according to the transition information stored in the transition information storage device and the object image generation program.

As described above, in the first aspect, the arbitrarily selected part of the object image is stored not as the image data indicative of the image itself but as its transition information which is far smaller in data amount than the image data itself. The selected object image is then recovered based on the stored transition information with the object image generation program. Therefore, since the amount of data to be stored and reproduced is small, it is possible to store and recover more images at higher speed.

In a preferred embodiment described later, the object image generation program is stored in ROM, and

the transition information storage device may be constructed of rewritable non-volatile memory. In this case, since the transition information storage device is constructed of rewritable non-volatile memory, the transition information stored in the transition information storage device is updated.

The ROM and the rewritable non-volatile memory are accommodated in a device that is removable from a body of the object image display apparatus. In this case, since the object image

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generation program and the transition information are stored in one body, high portability can be achieved.

Further, the ROM and the rewritable non-volatile memory are separately removable from the body of the object image display apparatus. In this case, the transition information storage device is constructed of the rewritable non-volatile memory, and the object image generation program and the transition information are accommodated separately, enabling the transition information storage device to be used in combination with another object image generation program.

Moreover, the apparatus further comprises a recovery device with a recovery program for recovering the object image arbitrarily selected by the user by operating the object image generation program using the transition information stored in the transition information storage device as an operational parameter.

Still further, the object image generator may be constructed so as to generate the object image according to progress of a game which varies in response to instructions from the user. In this case, the object image is reproduced according to the progress of the game even when the user does not specifically select any image.

The object image may be a two-dimensional image or a three-dimensional image.

Still further, the transition information includes

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coordinates and direction of an object and coordinates and direction of a viewpoint. In this case, therefore, it is possible to record and reproduce ∂ʰ arbitrary part of the object from an arbitrary viewpoint.

5   Still further, the transition information is game progress information in a game. In this case, therefore, it is possible to record and reproduce the image according to the progress of the game.

A second aspect of the present invention is directed to a
10   system for printing an object image, comprising:

an object image processing apparatus for processing the object image; and

a printer for printing the object image processed by the object image processing apparatus,

15   the object image processing apparatus

generating the object image by operating an object image generation program previously provided, according to instructions from a user;

selecting *aʰ* arbitrary part of the generated object
20   image, according to instructions from the user;

generating transition information of an object image representing the selected arbitrary part of the object image; and

recovering the object image arbitrarily selected by
the user by operating the object image ~~processing~~ *generation* program using
25   the transition information as an operational parameter, and

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the printer printing the recovered object image.

In the second aspect, for the arbitrarily-selected part of the object image, not image data is indicative of the image itself but the transition information that is far smaller in data amount

5   than the image data is generated.   Based on the generated transition information, the selected object image is recovered and printed.   Therefore, it is possible to select and print more images at higher speed.

In the embodiment described below the system further

10   comprises:

a display device for displaying a plurality of object images a recovered by operating the object image generation program using the transition information as an operational parameter, as recovered object images; and

15   a recovered image selector for selecting an arbitrary recovered object image from the recovered object images displayed on the display device according to instructions by the user, and a that printer prints the selected recovered object image.

In this case, it is possible to recover and display the

20   object images selected by the user, and the user can select an object image to be printed based on the display.

A third aspect of the present invention is directed to a system for printing an object image, comprising:

an object image generator for generating an object image

25   to be displayed and recovery data for the object image to be

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printed;

a recovery device for recovering the object image to be printed based on the recovery data supplied from the object image generator; and

5   a printer for printing the object image recovered by the recovery device,

the object image generator

generating the object image to be displayed by operating an object image generation program previously provided,

10   according to instructions from a user,

selecting *an* arbitrary part of the generated object image, according to instructions from the user, and

generating transition information of an object image representing the selected arbitrary part of the object image as

15   the recovery data,

the recovery device, with a program identical to the object image generation program stored therein, recovering the selected object image arbitrarily selected by the user by operating the program identical to the object image generation program using

20   the transition information as an operation parameter, and

the printer printing the recovered object image *using The printer*.

In the third aspect, the same effects as in the second aspect can be achieved, and the object image can be recovered with the object image generation program.

25   A fourth aspect of the present invention is directed to a

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method for printing an object image, comprising the steps of:

generating the object image by operating an object image generation program previously provided, according to instructions from a user;

5   selecting an arbitrary part of the generated object image, according to the instructions from the user;

generating transition information of an object image representing the selected arbitrary part of the object image;

recovering the object image arbitrarily selected by the

10   user by operating the object image generation program with the transition information as an operational parameter; and

printing the recovered object image.

As described above, in the fourth aspect, for the arbitrarily-selected part of the object image, rather than image data

15   indicative of the image itself the transition information that is far smaller in data amount than the image data is generated Based on the generated transition information, the selected object image is recovered and printed. Therefore, it is possible to select and print more images at higher speed.

20   In the embodiment described below the method further comprises the steps of:

comprises the steps of:

displaying a plurality of object images recovered by operating the object image generation program by using the transition information as the operational parameter, as recovered

25   object images;

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selecting an arbitrary recovered object image from the recovered object images displayed on the display device, according to instructions by the user; and

printing the selected recovered object image.

In this case, it is possible to recover and display the object images selected by the user, and the user can select an object image to be printed based on the display.

A fifth aspect of the present invention is directed to a recording medium with a computer program recorded thereon to control an object image generator for generating an object image,

the computer program causing the object image generator to execute the steps of:

generating an object image by operating an object image generation program previously provided according to instructions from a user;

selecting an arbitrary part of the generated object image, according to instructions from the user; and

generating transition information of an object image representing the selected arbitrary part of the object image, wherein

the object image arbitrarily selected by the user can be recovered at a future time according to the transition information stored in the transition information storage device and the object image generation program.

In the fifth aspect, an operational environment in the first

aspect

~~invention~~ can be achieved by loading the computer program to a computer.

In the embodiment described ~~later~~ *below*, the computer program further causes the object image generator to execute the steps

5   of:

recovering the object image arbitrarily selected by the user by operating the object image ~~processing~~ *generation* program using the transition information as an operational parameter; and

printing the recovered object image.

10   The computer program further causes the object image generator to execute the steps of:

displaying a plurality of object images recovered by operating the object image ~~processing~~ *generation* program as recovered object images, using the transition information as an operational

15   parameter; and

selecting an arbitrary recovered object image from the recovered object images displayed on the display device according to instructions by the user; and

printing the selected recovered object image.

20   In this ~~case,~~ *manner* it is possible to recover and display the object images selected by the user, and the user can select an object image to be printed based on the display.

A sixth aspect of the present invention is directed to an apparatus for displaying an object image, comprising:

25   an object image generator for generating the object image

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by operating an object image generation program previously provided, according to instructions from a user;

a selector for selecting *an* arbitrary part of the generated object image according to instructions from the user;

5   a transition information generator for generating transition information when the object image is selected; and

a transition information storage device for storing the transition information, wherein

the object image arbitrarily selected by the user is

10   recoverable after the *object* image generation program ends, according to the transition information stored in the transition information storage device and the object image generation program.

These and other objects, features, aspects and advantages

15   of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

20   FIG. 1 is a block diagram showing ~~the construction of~~ a television game system according to one embodiment of the present invention;

FIG. 2 is a block *diagram* showing ~~the construction of~~ a television game image print service system according to ~~the~~ *one* embodiment of the present invention;

25   the present invention;

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FIG. 3 is a memory mapping diagram in ~~the~~ *one* television game

image print service system according to the embodiment of the

present invention;

FIG. 4 is a flow chart showing the operation of the

5   television game image print service system according to ~~the~~ *one*

embodiment of the present invention;

FIG. 5 is a flow chart showing a detailed operation of a

game program execution subroutine shown in FIG. 4;

FIG. 6 is a flow chart showing a detailed operation of an

10   object drawing subroutine shown in FIG. 5;

FIG. 7 is a flow chart showing a detailed operation of a

print program execution subroutine shown in FIG. 4; and

FIG. 8 is a flow chart showing a detailed operation of a

print image selection program execution subroutine shown in FIG.

15   5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Described below is a television game image print system

incorporation
~~constructed by applying~~ a three-dimensional object image print

in
20   system according to one embodiment of the present invention to

w
a television game machine. ~~Prior to that, w~~ith reference to FIG.

1, ~~described first is~~ an example of the construction of a

including
television game system Sg ~~constructing~~ the television game image

will be described
print system. As shown in FIG. 1, the television game system Sg

25   includes a television game machine Ug, a memory cassette Mc

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storing data of a television game, a controller C operated by the

user to convey ~~the intention~~ *Commands* of a user to the television game

machine Ug and a television set D, which is a display device for

displaying a♦ game image.   The controller C generates a user

5   instruction signal Scu indicating the intention of the user

according to the user's operation.

The memory cassette Mc includes ROM 1 storing an execution

program for the game, and non-volatile flash memory 3 storing data

indicative of the game image selected by the user (hereinafter

10   referred to as "selected game image data").

The television game machine Ug includes a CPU 5, work RAM

7, a display circuit 9, and display RAM 11.   The CPU 5 is bi-

directionally connected to the ROM 1 and the flash memory 3 in

the memory cassette Mc to exchange game program data Sp and

15   selected game image data Ssi, respectively.   The CPU 5 is further

connected to the controller C to receive input of the user

instruction signal Scu.

According to the game program data Sp fed from the ROM 1

and the user instruction signal Scu, the CPU 5 performs various

20   calculation to make the game proceed, determines the game contents

to be displayed, and generates display game image data Scv

representing the determined game contents.   The CPU 5 is connected

to the work RAM 7, and exchanges working data Sw generated at

calculation.

25   The display circuit 9 is connected to the CPU 5, and when

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supplied with the display game image data Scv, generates game video data Sv to be actually displayed on the television device D. The display circuit 9 is connected to the display RAM 11, and temporarily stores the generated game video ~~audio~~ data Sv.

5   As a matter of course, the television game machine Ug may include an audio processing circuit for reproducing audio data that provides sound effects according to the progress of the game. However, description of audio processing is omitted herein for the purpose of simplification.

10   With reference to FIG.2, described is the television game image print service system according to ~~the~~ *one* embodiment of the present invention. As shown in FIG. 2, a television game image print service system Sgp further includes the memory cassette Mc, the television game machine Ug, a video printer P, and a print

15 control circuit Cp. Assume that the selected game image data Ssi has already been stored in the flash memory 3 in the memory cassette Mc.

       The CPU 5 is connected to the ROM 1, ~~the work RAM 7~~ and ~~the~~ *The Work Ram 7* ~~display circuit 9~~ to exchange the game program data Sp, ~~the~~

ment

20   *a* ~~selected game image data Ssi, and the display game image data Scv,~~ ~~respectively.~~ The CPU 5 then executes the game program data Sp read from the ROM 1, and generates the display game image data Scv according to the selected game image data Ssi and a print control signal Scp.

25   The display circuit 9 is connected to the CPU 5, and when

supplied with the display game image data Scv, generates the game

video data Sv to be actually printed out on the video printer P.

The print control circuit Cp is connected to the CPU 5, and when

supplied with the print control signal Scp, generates a video

5   printer control signal Scvp for controlling a drive of the video

printer P.

The video printer P is connected to the print control

circuit Cp and the display circuit 9, and when supplied with the video

printer control signal Scvp and the game image video data Sv,

10   respectively therefrom, prints out the image selected by the user.

In FIG. 3, There is shown is a memory structure in the ROM 1, the

RAM and the flash memory 3 in the present embodiment. As shown

in the drawing, the ROM 1 stores a program and various data

representing three-dimensional object images. The RAM stores a

15   frame counter, and data indicative of three-dimensional object

image data according to the progress of the game. In the present

embodiment, the coordinates and direction of each object and the

coordinates and direction of a camera are stored as transition

information. Such transition information is alternately renewed

20   as to keep old and new information simultaneously.

In the flash memory 3, the transition information of the

selected three-dimensional object images for each frame are

sequentially stored in a transition information area therein.

Furthermore, recorded in a print specifying index area are print

25   object pointers Pobj1 to Pobjn (n is the number of three-

dimensional object images to be printed) indicative of frame

numbers in which the transition information of the images to be

printed is stored among the selected three-dimensional object

images. For example, when 1 is stored in the print object pointer

5   Pobjn, that means, in FIG. 3, the three-dimensional object image

of frame 1 is specified as the image to be printed.

In the television game system Sg and television game image

print service system Sgp as constructed above, the memory cassette

storing the selected game image data Ssi of the game and game data

10   is brought in to a print laboratory for print, thereby allowing

the user to obtain a specific image obtained through play as an

easily-portable medium such as a photo.

In other words, in such print system in which the selected

digital game image data is handed in to a print laboratory for

15   print on a paper medium, by handing in the memory cassette storing

the transition information (Ssi) of the game as digital data to

the print laboratory, it is possible to extremely reduce or

totally eliminate a workload of developing a program for print-out

at a game software side and ~~a load of~~ using memory space ~~with the~~ *for such a*

20   program. Furthermore, the system is constructed so as to be able

to reduce storage space of image data and to provide a more flexible

print menu by equipment replacement at a print laboratory's side

without altering the game software.

More particularly, in the present system, it is possible

The

25   to extremely reduce or totally eliminate ~~a~~ workload of developing

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the game software, thereby allowing reduction in development duration, which is an important factor in game development. Furthermore, since the transition information requires far less memory compared with image data after drawing, the memory cassette

5   can store many images. Further, the print laboratory's side can take any form as long as the print laboratory can change the resolution of drawn image at will when printing according to situations and requirements. The print laboratory may also first output the image only in a limited range of the transition

10   information, and then other image based on the transition information according to demands. For example, the present system has flexibility of easily coping with images even not required at development, by modifying a printout device according to demands after product release.

15   With reference to FIG. 4, described next is the operation of the three-dimensional image data print system according to the present embodiment. First, in step S100, the ID of a device connected to a controller connector of the television game machine Ug is detected. The procedure then advances to the next step S300.

20   In step S300, it is determined by the ID detected in step S100 whether the video printer is connected to a controller 4 (4CON) of the television game machine Ug. If the determination result is No, the procedure advances to step S500, where the game program stored in the ROM 1 is executed and then the procedure

25   ends. On the other hand, if the determination result is Yes, the

procedure advances to step S700, where the print program stored in the ROM 1 is executed and then the procedure ends. The detailed operation in steps S500 and S700 will be described ~~later~~ *below* with reference to FIGS. 5, 6, and 7.

5   As described above, in the present system, the image to be printed is generated by using the hardware and game program of the game machine as they are, and therefore it is possible to construct a shop print system as a print laboratory with a simple external apparatus. As a result, system costs can be reduced.

10   Specifically, when the memory cassette Mc accommodates both of the game program Sp and the image information Ssi, the program in the cassette side determines what type of print service is provided without depending on the apparatus at the shop. Therefore, new service can be advantageously provided without

15   replacing the shop apparatus whenever a new game cassette (program) is provided. Also in terms of operability, since connection to the printer triggers switching between game play and print, the operator can easily operate the system without any operation for switching. The program for printout at print

20   laboratories or shops may be included in a program on the CD-ROM instead of the ROM 1 of the memory cassette Mc.

        With reference to FIG. 5, described is the processing of a game program execution subroutine in the above step S500. In step S300, when it is determined that the video printer is not

25   connected to the controller 4 (4CON), first,

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in step S502, a game menu is displayed on the television device D. In the game opening menu, for example, four alternatives "From start", "Continue", "Gallery", and "Option" are presented to the user. When the user wants to play the game from start, the user selects "From start". When the user has played and temporarily stopped the game, the user selects "Continue". Selection of "Gallery" and "Option" will be described below.

When the user selects "Gallery" in the opening menu, "Select print" is selected in step S530, and a print image selection program execution routine starts in step S800, which will be described in detail later with reference to FIG. 8.

On the other hand, when the user selects "Continue" in the opening menu, a sub-menu is displayed offering four alternatives, "Go to course", "Pokemon report", "Pokemon album", and "Record", for example. In the present embodiment, the processing when "Go to course" is selected is shown in steps S504 to S524.

In step S504, for example, three courses, Course A, Course B, and Course C are offered for the user as selectable alternatives. In this course selection screen, for example, "Beach", "Tunnel" and others are offered as selectable courses.

When the user selects Course A in step S504, the procedure advances to step S506, where it is set that game data for Course A is read from the ROM 1. Similarly, when Course B is selected, the procedure advances to step S508, where read of game data for

Course B is set.   When Course C is selected, the procedure advances

to step S510, where read of game data for Course C is set.

After read of each course data is set in steps S506, S508,

and S510, the procedure advances to step S512.

5   In step S512, the maximum user-selectable number of game

images N_f Npmax is set. The procedure then advances to step S600.

In step S600, a game image, that is, an object including

Pocket Monsters and backgrounds, is drawn for one frame according

to the selected course data.   The procedure then advances to step

10   S513.   The object drawing subroutine S600 by this step will be

described later in detail referring to FIG. 6.

In step S513, it is determined whether end conditions of

going around the course are satisfied.   If No, the procedure

advances to step S514.

15   In step S514, it is determined whether an object is selected

by the user.   To select an object, the user uses the controller

C, imitating operation of aiming at the object displayed on the

television device D and pressing the shutter on a camera.   If No

is determined in step S514, the procedure returns to the object

20   drawing subroutine in step S600 S500, wherein another object image for

one frame is drawn.

On the other hand, in step S514, if Yes, that is, if it is

determined that the user has selected part of the object image

of the present frame, the procedure advances to step S516.

25   In step S516, the transition information indicating which

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part of the present frame and under which conditions the user has selected (pressed the shutter) is stored in the flash memory 3 as the selected game image data Ssi. The procedure then advances to step S518. As will be described in detail *below* data ~~later~~, used as the

5   transition information can be data indicative of the relation between the operation of the controller and the progress of the game by the time the user presses the shutter. Furthermore, the transition information may be coordinates of an image that can be picked up by an avatar that represents the user holding a camera

10   and pressing the shutter.

In step S518, the number of exposures that can be taken Nf is decremented by 1, and the procedure then advances to the next step S520.

In step S520, it is determined whether the number of

15   exposures Nf is 0 or not. If No, that is, if the number of exposures Nf is not 0 and the user can still take pictures, the procedure returns to the object drawing subroutine in step S600, where an object for the next one frame *that* ~~is~~ further drawn.

When it is determined in step S513 *that* the end conditions have

20   been satisfied, and when it is determined in step S520 that the number of exposures Nf is 0 and the user can no longer take pictures, the procedure advances to step S522.

In step S522, each object image taken (selected) by the user pressing the shutter is graded based on references such as the

25   size and pose of a character and picture-taking techniques. Other

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arbitrary references can be added to these references for grading, such as rareness of the character. After such grading, the procedure advances to step S524.

In step S524, scores obtained by grading in the above step S522 are displayed. The procedure then returns to step S502.

Next, with reference to FIG. 6, described in detail is the object drawing subroutine in step S600 shown in FIG. 5. If No in step S530, that is, if the number of exposures Nf is set in S512, if it is determined that the shutter has not been pressed in step S514, or if the number of exposures Nf is not 0 in step S520,

in step S602, the operational state of the controller C is read. The procedure then advances to the next step S604.

In step S604, based on the state of the controller C read in step S602, new object map data representing the objects that can be observed from the user's avatar is read. The procedure then advances to the next step S606.

In step S606, based on the new object map data read in step S604, objects Obj1, Obj2, ..., Objm of the image for one frame that can be observed from the user's avatar are calculated. The procedure then advances to the next step S608.

In step S608, the calculated objects Obj1, Obj2, ..., Objm are drawn on the television device D. The procedure then ends.

Next, with reference to FIG. 8, the print image selection subroutine in step S800 shown in FIG. 5 is described.

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First, in step S802, a print frame counter indicating the number of prints of the image desired by the user is reset to 0.

In step S804, the whole transition information of the selected three-dimensional objects is read from the flash memory 3.

In step S806, based on the read transition information, the selected three-dimensional object images are all drawn and displayed at a glance.

In step S808, the user selects a specific image from among the displayed three-dimensional object images using a pointer such as a direction switch, a joystick, or a mouse. Then, to print out the selected three-dimensional object image, the user operates input means located on the pointer to register the three-dimensional object as an image for print.

In step S810, it is determined whether the user registers the displayed image for print. If Yes, that is, if the image is registered, the procedure advances to step S812.

In step S812, frame numbers (FIG. 3) of the flash memory 3 with the transition information of the registered three-dimensional object image stored therein are stored in the print object pointer Pobjn in sequence.

In step S814, the print frame counter, which has been reset to 0 in step S802, is incremented by 1, and then the procedure advances to step S816.

On the other hand, if No is determined in step S810, the

procedure advances to step S816.

In step S816, it is determined whether there is an image to be printed among the displayed three-dimensional object images. Further, when there is an image to be printed among the displayed

5 three-dimensional object images, No is determined, and the procedure returns to step S808 and repeats processing in the above steps S810, S812, and S814 until Yes is determined in step S816. Then, the frame numbers (FIG. 3) of the flash memory 3 storing the transition information of the three-dimensional object image

10 to be printed are stored in the print object pointers Pobj1, Pobj2, ... in sequence, and the print frame counter is incremented by 1 such as 1, 2, ... in sequence.

Then, in step S816, if Yes, that is, if the three-dimensional object images to be printed have been all registered,

15 the procedure advances to step S818.

In step S818, it is determined whether the value of the print frame counter is i times (i is a positive integer) the number of printable frames for each printing sheet. When i is 1, the value of the print frame counter equals to the number of printable frames

20 for each printing sheet. That is, the three-dimensional object images registered in the above described step S808 are printed on all frames on one printing sheet, meaning that there is no blank frame on the printing sheet after printing. Therefore, if Yes is determined in this step, the registered three-dimensional

25 objects can be printed over i printing papers without any wasted

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frame, and therefore the procedure ends.

However, if No is determined in step S818, there is a frame without print. Therefore, the procedure returns to step S808 and repeats steps S810 to S816, and when the value of the print frame

5　counter becomes i times the number of printable frames (S818), the procedure ends.

Furthermore, in step S814, the print frame counter may be incremented by an arbitrary positive integer C not less than 2, instead of by 1. In this case, the same three-dimensional object

10　image can be printed out C times.

Next, with reference to FIG. 7, described is the print program execution subroutine in step S700 shown in FIG. 4. When it is determined that "4CON is inserted" in step S300 shown in FIG. 4,

15　in step S702, the frame counter for counting the number of images to be printed is reset to 0. The procedure then advances to step S704.

In step S704, the frame counter is incremented by 1. Since the frame counter is reset to 0 in step S702, the value of the

20　frame counter indicates 1 immediately after execution of the print program.

In step S706, the transition information of the three-dimensional object image to be printed is read from a transition information storage part of the flash memory 3 based on the print

25　object pointer Pobj1 in the print specifying index area of the

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flash memory 3.

In step S708, based on the read transition information, the three-dimensional object images Obj1, ..., Objm are drawn.

In step S709, the images drawn in step S708 are captured

5 by the video printer.

In step S710, it is determined whether the value of the frame counter is smaller than that of the print frame counter. If Yes, that is, if any registered three-dimensional object image to be printed has not yet been read from the transition information area

10 of the flash memory 3, the procedure returns to step S704. The procedure then repeats steps S704 to ~~S708~~ _S709_ until No is determined in step S710, causing the three-dimensional object images of the print object pointers Pobj2, Pobj3, ..., to be sequentially read.

On the other hand, if No, that is, if all three-dimensional

15 object images registered to be printed in the print image selection program execution routine in step S800 have been read, the procedure advances to step S712.

Then, in step S712, print instruction is outputted, thereby printing the selected object images on the printing sheet without

20 any wasted frame.

As described above, after it is determined that "4CON is inserted" in step S300 shown in FIG. 4, a new step S701 may be provided before step S702 in the print program execution subroutine in step S700. That is, in step S701, the print image

25 selection program is executed in the above step S800. When no

image to be printed is registered, the user is notified by display

that no image to be printed is registered, and prompted to register

any image to be printed.   In addition to such display,   the print

image selection program in step S800 may be executed.   In any case,

5   when images to be printed on a printing sheet are not appropriately

registered, printing process is not started, thereby preventing

printing with any blank frame on the printing sheet.

As described above, in the system where images are printed

on a 16-split or 9-split sticker and can be selected individually,

10   it is effective that the user cannot exit the present mode until

the images are filled in all frames without any blank frame.   That

is, in a system where image data is handed in through a digital

media to a laboratory that specifies each image individually or

a group of plural frames and creates 16-split-sticker print, in

15   order to prevent a minor from erroneously leaving a frame blank

and getting frustrated, the system does not allow the minor to

exit the selection mode until no blank frame is present when

selecting the image.

As   described   above,   in   the   present   specification,

20   three-dimensional object image data is exemplarily described as

the subject to be processed in the present invention.   However,

the   subject   includes   two-dimensional   image   data.   When   two-

dimensional   image   data   is   to   be   processed,   the   transition

information is information with which an image can be specified,

25   such as   two-dimensional   coordinates   defining   a   predetermined

range on a two-dimensional plane, or progress information of the game.

In the present invention, as the two-dimensional or three dimension image data, the user can have a character of the user's avatar go around the virtual world constructed in the game to take pictures of the virtual world itself including characters living therein, and output the taken images of the virtual world as real photos. The user can take pictures of the virtual world by having the character of the user's avatar go around the virtual world in the game, to select virtual characters living therein and take pictures of the virtual characters in various pauses in response to instructions.

Described in detail in the present specification is an example that an arbitrary image in the virtual world is selected, photographed, and outputted as a real photograph. In other words, the example described herein is a game in which a hero, which is an avatar of the user, rides a vehicle and photographing monsters while moving in a three-dimensional space.

However, the present invention does not depend on the types of game, and is further applicable to applications for printing out images of the virtual world as photographs without the user's selection of a subject to be photographed. Such games includes RPGs (role playing games), shooting games, simulation games, and action games.

Described briefly below is the case in which the present

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invention is applied to an RPG. The RPG is a game in which the user is a hero, adventuring on various towns or caves. In such game, the hero goes to unknown towns or caves one after another, thereby making the game proceed. For recording the town or cave

5   the hero visited, transition information is written in a predetermined area of rewritable memory (RAM, a magnetic disk, a DVD, and flash memory, for example). In this case, the transition information corresponds to, for example, a flag set in the memory area corresponding to a predetermined town or cave.

10   If the print service system side is provided with a function for printing out images of scenery at the place the hero visited with correspondence to the flag in the memory area, it is possible to print out an image of specific part of the virtual world, a scenery collection of entrances of the caves the hero has visited,

15   for example, without requiring the user to perform a kind of image selection operation of selecting or photographing the image. Furthermore, the print image of the scenery collection is provided for the print system side. Therefore, service can be planned or developed to be provided even after release of the game.

20   In view of the above, it is clear that the transition information is not limited only to the information indicating transition states of a three-dimensional object image representing arbitrary part of a three-dimensional object image, but means the entire or part of information to be recorded

25   according to the progress of the game.

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While the invention has been described in detail, the foregoing description is in all aspects illustrative and not restrictive. It is understood that numerous other modifications and variations can be devised without departing from the scope

5   of the invention.